

THE NORTH CAROLINA
COLLEGE OF AGRICULTURE AND MECHANIC ARTS
AGRICULTURAL EXPERIMENT STATION

W. A. WITHERS, A.M., ACTING DIRECTOR.



Preservatives in Canned Foods

Offered for Sale in North Carolina.

W. A. WITHERS AND H. W. PRIMROSE



RALEIGH, N. C.

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THE NORTH CAROLINA COLLEGE OF AGRICULTURE AND MECHANIC ARTS

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RALEIGH, N. C.

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The Station is glad to receive any inquiries on agricultural subjects. *Address all communications to the Agricultural Experiment Station, and not to individuals.* They will be referred to the members of the Station staff most competent to answer them.

Samples for analysis should be sent to the State Chemist.

* Member of Station Council.

(i) On leave of absence.

PRESERVATIVES IN CANNED FOODS

OFFERED FOR SALE IN NORTH CAROLINA.

W. A. WITHERS, A. M., CHEMIST.

H. W. PRIMROSE, B. S., ASSISTANT CHEMIST.*

ACKNOWLEDGMENT.

Acknowledgment is hereby made for the valuable information contained in BULLETINS 13 (part VIII) and 51 of the Division of Chemistry of the United States Department of Agriculture. The reader is referred to these bulletins for a full discussion relating to the subject of canning, preservatives, etc.

PRESERVATION OF FOOD BY CANNING.

The various articles for human consumption will undergo change upon exposure to the air for a greater or less period of time, and as a result various gases are given off, some of which are ill smelling, and the substances left behind are unfit for food. It was formerly thought that these changes were brought about by the oxygen of the air. More recent investigations have shown that they are caused by minute living organisms, which are found in the air, water and the food itself. In order to keep the foods "fresh" and wholesome it is necessary for us to kill the living organisms which are present, and to exclude others. If we maintain a sufficient temperature for a sufficient time the organisms are destroyed.

Heat kills the organisms, and a vessel sealed air-tight will keep out the organisms which are present in the air. The method therefore which at once suggests itself is to sterilize the can and the food by heating to a sufficiently high temperature, and sealing the can while hot. As this is done at a high temperature when the can cools there will be a contraction, in consequence of which the end of the can will be depressed. This depression is an indication that no fermentation has taken place since sealing. A "*swelled*" can has *certainly undergone fermentation of its contents, and should not be used*. When cans are opened the entire contents should be removed immediately, and a very long period of time should never be allowed to elapse between the opening of the can and the eating of its contents.

* Except where a statement to the contrary is made, the analytical work was performed by Mr. Primrose, under direction of the Chemist.

DIFFICULTIES ENCOUNTERED IN CANNING.

Although the method outlined above is extremely simple, and is doubtless practiced by every housekeeper to some extent, yet there are difficulties which are also familiar. Although heating will destroy the germs yet in some instances it is necessary to continue boiling for a greater or less period of time in order that the interior may reach the boiling point and thus be completely sterilized. The effects of prolonged boiling are the softening or falling to pieces of the articles of food, and in some instances the abstraction of a part of the original color, which diminishes the attractiveness of the food.

Incomplete sterilization would, of course, leave germs present to bring about the decay.

PRESERVATIVES.

A remedy for the extended boiling is to add some substance which is capable of destroying the living organisms. Such substances are called preservatives. If such substances were used without boiling it would be necessary to add very large quantities. The method usually followed, is to add the preservative, seal, heat, make a little hole to allow the escape of the air and then seal up the little hole. By heating, it is not necessary to add such large quantities of the preservative. For vegetables the most common preservative is salicylic acid, and after it sulphurous acid, in the form of sulphites. Benzoic acid, hydronaphthol, fluorides, formaldehyde, etc., are probably used also. For canned meats boric acid and borax are probably the more important preservatives.

As to the harmfulness of these added preservatives, there may be a question. There is probably no fairer statement to both canner and consumer than that of Dr. Wiley:

"First, that the use of added preservatives is, upon the whole, objectionable; second, that their absolute inhibition is not warranted by the facts which have come to our knowledge, but in all cases their presence should be marked on the label of the can." With this information the consumer, with the advice of his physician, may judge for himself as to the danger of eating canned foods.

OTHER FOREIGN SUBSTANCES.

Boiling of vegetables tends to remove the original color and to soften them. The use of copper for greening is old, and while the addition of copper and zinc in small quantities may not be injurious to health, yet it would seem proper for the presence of these substances and their amounts to be stated on the labels of the cans, just as is recommended in the case of preservatives.

Other substances which may be present are lead and tin which may be dissolved from the can or the solder. The presence of lead is

particularly objectionable, and it would seem that legislation fixing the maximum amount of lead to be used in the tin and the solder would be desirable.

In this investigation the principal object was to determine the extent to which preservatives were used, and tests were not made for the presence of the metals, except in a few instances.

COLLECTION OF SAMPLES.

The samples were bought upon the open market by some member of the Station staff, in Durham, Greensboro, and Statesville, and may be taken as representative of the canned foods on sale in the State.

METHODS OF ANALYSIS.

The methods followed were those given in BULLETINS 13 (part VIII) and 51 of the Division of Chemistry of the United States Department of Agriculture.

Very few samples were examined for metals, the principal object being to detect the preservatives if present. In nearly every sample tests were made for salicylic and sulphurous acids, benzoic and boric acids, hydronaphthol, formaldehyde and fluorides.

SUMMARY OF RESULTS.

Eleven samples of fruits were examined and all (*equivalent to one hundred per cent*) were found to contain preservatives, and no mention of this was made on the label. The list includes two samples of apples, one of pineapple, three of peaches, and three of blackberries which contained salicylic acid, and one sample each of peaches and of blackberries which contained both salicylic and sulphurous acids.

Twenty samples of vegetables were examined, and twelve (*representing sixty per cent*) were found to contain preservatives, and no mention of this was made on the label. This list included five samples of tomatoes, two of peas, one of corn, and two of pork and beans, in which salicylic acid was found, and two of corn in which both salicylic and sulphurous acids were found. One sample each of lima beans, snap beans, tomatoes, baked beans with tomato sauce, and succotash, and three of corn, contained no added preservative.

One sample each of clams, sausage, steak, potted tongue, and two samples each of oysters and salmon were examined, but no added preservative was found.

As a summary of the whole it may be stated that no added preservative was found in the canned meats, but that one hundred per cent of the canned fruits and sixty per cent of the canned vegetables contained salicylic acid, and that eighteen per cent of the fruits and ten per cent of the vegetables contained in addition sulphurous acid.

Metals were not tested for in all the samples, but they were found in several of those where tests were made for them.

In view of these facts the wisdom of the State legislation on the subject of food adulteration is apparent.

DESCRIPTION OF SAMPLES.

- 1047 *Lima Beans, Pilgrim*.—Packed by Bennett Sloan & Co., New York. Bought in Statesville, N. C. No preservative was found.
- 1048 *Heinz's Baked Beans, with Tomato Sauce*.—H. J. Heinz & Co., Pittsburg, Pa. Bought in Statesville, N. C. No preservative was found.
- 1049 *Apples, Jumbo Brand*.—Packed by Miller Bros., Baltimore, Md. Bought in Statesville, N. C. Salicylic acid was found.
- 1050 *Select Cherry Stone Lunch Oysters*.—Packed by Martin Wagner & Co., Baltimore, Md. Bought in Statesville, N. C. No preservative was found.
- 1051 *Cove Oysters*.—Berkeley Canning and Manufacturing Co., Mt. Pleasant, S. C. Bought in Statesville, N. C. No preservative was found.
- 1052 *Vienna Sausage, Extra Quality*.—Packed by Armour & Co., Chicago, Ill. Bought in Statesville, N. C. No preservative was found.
- 1053 *First Quality Blackberries*.—Packed by Mountain View Cannery, A. G. Corpening, Prop., Cora, N. C. Bought in Statesville, N. C. Salicylic acid was found.
- 1054 *Potted Tongue, Kingan's Reliable...Best Quality*.—Kingan & Co., Indianapolis, Ind. Bought in Statesville, N. C. No preservative was found.
- 1055 *Fresh Clams...Little Neck. Bar Harbor Brand*.—Packed by A. E. Farnsworth, Southwest Harbor, Mt. Desert, Me. Bought in Statesville, N. C. No preservative was found.
- 1056 *Superior Minced Steak*.—Packed by Armour & Co., Chicago, Ill. Bought in Statesville, N. C. No preservative was found.
- 1057 *Premier Columbia River Salmon*.—Packed by Frances H. Leggett & Co., New York. Bought in Statesville, N. C. No preservative was found.
- 1058 *Pilgrim Tomatoes*.—Packed by Bennett Sloan & Co., New York. Bought in Statesville, N. C. Salicylic acid was found.
- 1059 *Tomatoes*.—Packed by J. P. Collins, Troutman, N. C. Bought in Statesville, N. C. No preservative was found.
- 1060* *Sweet Corn, Iredell Brand*. Packed by J. P. Collins, Troutman, N. C. Bought in Statesville, N. C. No preservative was found.
- 1061* *Sunbeam Corn*.—Packed by Austin Nichols & Co., New York. Bought in Statesville, N. C. No preservative was found.

* Analysis by Mr. J. A. Bizzell, under direction of the Chemist.

- 1070* *Succotash*.—Packed by Wayne Co. Preserving Co., Fairpoint, New York. Bought in Statesville, N. C. No preservative was found.
- 1318 *Dixie Brand Salmon*.—Queen Packing Co., Aberdeen, Washington. Bought in Durham, N. C. No preservative was found.
- 1319 *Tomatoes...First Quality*.—Packed by Beal, Adams & Co., Bel-Air, Md. Bought in Durham, N. C. Salicylic acid was found.
- 1320 *First Quality Pie Peaches*.—Packed by Thomas J. Myer & Co., Baltimore, Md. Bought in Durham, N. C. Salicylic and sulphurous acids were found.
- 1321 *Royal Beauty Tomatoes*.—Packed by W. B. Davie & Co., Richmond, Va. Bought in Durham, N. C. Salicylic acid was found in small quantity.
- 1322 *Royal Red Brand California Lemon Cling Peaches*.—Packed by Sacramento Preserving Co. Bought in Durham, N. C. Salicylic acid was found in small quantity.
- 1323 *Turtle Dove Brand Peaches, First Quality*.—Packed by Jordan Trotter & Co., Cambridge, Md. Bought in Durham, N. C. Salicylic acid was found.
- 1324 *Globe Brand Sugar Corn, Finest Quality*.—Curtice Canning Co., Rochester, N. Y. Packed at Vernon, Oneida Co., N. Y. Bought in Durham, N. C. Salicylic acid was found.
- 1325 *Gold Cord Sweet Corn. First Quality. Sweet and Tender*.—Packed by A. V. Lane, Tabery, Oneida Co., N. Y. Bought in Durham, N. C. Salicylic and sulphurous acids were found.
- 1326 *Johnson Brand Tomatoes*.—Packed by J. B. Johnson & Co., Blades, Del. Bought in Durham, N. C. Salicylic acid was found.
- 1327 *The Wayside Inn, Coreless Sliced Pineapples*.—Packed by Thurber, Whyland & Co., New York. Bought in Durham, N. C. This sample contained a very large amount of salicylic acid.
- 1328 *Queen's Taste Sweet Corn*.—Packed by Wilson, Burns & Co., Baltimore, Md. Bought in Durham, N. C. Salicylic and sulphurous acids were found.
- 1329 *Wilkes Brand Blackberries*.—Packed by the Brushy Mountain Canning Co., North Wilkesboro, N. C. Bought in Greensboro, N. C. Salicylic and sulphurous acids were found.
- 1330 *My Wife's Best Baked Pork and Beans*.—Packed by Mrs. Sydney Arnold, no address given. Bought in Greensboro, N. C. Salicylic acid was found.
- 1331 *Virginia Standard Tomatoes*.—Packed by C. M. Nalls, Amsterdam, Va. Bought in Greensboro, N. C. Salicylic acid was found in fairly large quantity.
- 1332 *Early June Peas...Baltimore Oriole Brand*.—Packed by

- Somers Foote & Co. No address given. Bought in Greensboro, N. C. Salicylic acid was found.
- 1333 *Piedmont Beauty Brand Blackberries*.—Packed by Edwards & Stone, Kernersville, N. C. Bought in Greensboro, N. C. Salicylic acid was found.
- 1334 *Choice Blackberries*.—Packed by Edwards & Stone, Kernersville, N. C. Bought in Greensboro, N. C. Salicylic acid was found.
- 1335 *Pocahontas Fancy Sugar Corn. Solid Packed*.—Packed by the Taylor and Bolling Co., Richmond, Va. Bought in Greensboro, N. C. No preservative was found.
- 1336 *Early June Peas...Seldom Equalled, Never Excelled*.—Packed and guaranteed by J. S. Farren & Co., Baltimore, Md. Bought in Greensboro, N. C. Salicylic acid was found.
- 1337 *Standard Peaches. First Quality*.—Grown and packed by Gilmer & Smith, Greensboro, N. C. Bought in Greensboro, N. C. Salicylic acid was found.
- 1338 *Van Camp's Pork and Beans, with Tomato Sauce*.—Packed by Van Camp Packing Co., Indianapolis, Ind. Bought in Greensboro, N. C. Salicylic acid was found.
- 1339 *Snap Beans*.—Packed by Henry Hunter, Greensboro, N. C. Bought in Greensboro, N. C. No preservative was found.
- 1340 *Fresh First Quality Apples*.—Packed by Huguenot Canning Co., Huguenot, Va. Bought in Greensboro, N. C. Salicylic acid was found.